DOCUMENT RESUME

ED 247 723 EC 170 078

AUTHOR Pien, Diana
TITLE The Development of Language Functions in Deaf Infants of Hearing Parents.
PUB DATE Jun 84
NOTE 30p.; Contained in: International Symposium on Cognition, Education, and Deafness (Washington, DC, June 5-8, 1984). Working Papers. Volumes I and II. David S. Martin, Ed.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Communication Skills; *Deafness; Infants; *Interaction; *Language Acquisition; *Parent Child Relationship; *Pretend Play

ABSTRACT

Five deaf infants with hearing parents enrolled in a parent-infant intervention program using total communication were videotaped during free play sessions with their parents. Videotapes of each child at program entry and program exit were analyzed. The functions of children's gestures, pointing responses, communicative vocalizations, and signs were coded using adaptations of M. Halliday's categories of language. The data supported Halliday's order of functional development. For all five children, the Instrumental, Regulatory, Interactional and Personal functions developed prior to the Heuristic, Imaginative, and Informative functions as predicted by Halliday's model. The present data, however, differed from Halliday's theory in that the development of the latter three functions was not necessarily concurrent with the development of syntax (i.e., combination of signs and/or gestures to form multi-sign language for the Imaginative, Heuristic and Informative functions). Imaginary pretend play episodes appeared to facilitate the use of both the Imaginative and Informative functions. This unexpected finding that the Information function appeared frequently in imaginary pretend play episodes was interpreted in terms of shared role-taking skills involved in imaginary pretend play and the Informative function and in terms of imaginary pretend play as one motivator for the use of language to convey new information unknown to the audience. (Author/CL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED247723

THE DEVELOPMENT OF LANGUAGE FUNCTIONS IN DEAF INFANTS OF HEARING PARENTS

Diana Pien
David T. Siegel Institute for Communicative Disorders
Michael Reese Hospital, Chicago, IL

Abstract

The development of effective communication skills is one of the primary goals of educational intervention programs for deaf children. This paper uses Halliday's theory as a framework for examining the development of language functions in deaf infants with hearing parents. Five deaf infants with hearing parents enrolled in a parent-infant intervention program using total communication were videotaped during free play sessions with their parent(s). Videotapes of each child at program entry and program exit were analyzed in this study. The functions of children's gestures, pointing responses, communicative vocalizations, and signs were coded using adaptations of Halliday's categories of language functions.

The present study's data supported Halliday's order of functional development. For all five children, the Instrumental, Regulatory, Interactional and Personal functions developed prior to the Heuristic, Imaginative, and Informative functions as predicted by Halliday's model. The present data, however, differed from Halliday's theory in that the development of the latter three functions was not necessarily concurrent with the development of syntax (i.e., combination of signs and/or gestures to form multi-sign language for the Imaginative, Heuristic and Informative functions, imaginary pretend play episodes appeared to facilitate the use of both the Imaginative and Informative functions. This unexpected finding that the Information function appeared frequently in imaginary pretend play episodes was interpreted in terms of shared role-taking skills involved in imaginary pretend play and the Informative function and in terms of imaginary pretend play as one motivator for the use of language to convey new information unknown to the audience.

Specific implications of this research for language programming in parent-infant and preschool programs for hearing-impaired children are discussed with respect to both assessment and intervention procedures.

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Diana Pien

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

EC170028

Working Paper presented

at the

International Symposium

on

Cognition, Education, and Deafness

Gallaudet College, Washington, DC, June 5-8, 1984

Introduction

The development of effective communicative skills is one of the primary goals of educational intervention programs for deaf children. One very important aspect of communicative competence involves learning to use language for a variety of functions including requesting actions, asking information-seeking questions, describing events, promising, making jokes, etc. Learning how to use language for these varied functions involves more than the acquisition of semantics and syntax; it also depends on the construction of a social reality. For language requires not only the formation of person and object concepts for word acquisition, but also knowledge of social roles and relationships. In addition the speaker must make cognitive inferences regarding relations between events and the listener's willingness and ability to perform desired acts. Thus the child must integrate social, cognitive, and linguistic knowledge in order to produce grammatical sentences that are functional and appropriate for the context.

The two most prominent theories of functional development have been proposed by Dore (1974, 1975), and Halliday (1975a, 1975b, 1978). Based on the Speech Act analysis of adult utterances (see Austin, 1962; Searle, 1969), Dore has attempted to describe the child's acquisition of the components of an adult speech act, starting with single-word utterances. In contrast, Halliday has not attempted to apply an analysis of adult function to the child language. Instead he has tried to derive the functions served by child language directly from the child's pre-linguistic gestures and vocalizations. Halliday presents a theory of how an infant learns to make meanings via a language system that is <u>not</u> an imperfect form of adult language, but rather evolves through the differentiation and integration of earlier functions into the adult components of language. Such a system develops out of intersubjective acts, i.e., mutual social interactions between child and significant others (Trevarthen, 1980; Halliday, 1978).

Because Halliday's model is more detailed and child-process oriented, we have used his theory as a framework for analyzing early language functions in deaf children. Halliday's model has the further advantage of encompassing both prelinguistic and linguistic acts in contrast to Dore's model which is not applicable to prelinguistic acts. Finally Dore's model does not address the prelinguistic-linguistic transition which is central to Halliday's theory.

The first of this paper briefly describes Halliday's theory in order to set the framework for the adaptation of Halliday's functional categories for deaf children. The second part of the paper applies Halliday's model in analyzing the functional use of oral and manual prelinguistic and linguistic acts by five deaf infants of hearing parents. These analyses focus on individual differences among the five children in their functional development.

Halliday's Model of Language Functions

Halliday's functional analysis of child language is derived directly from extensive data collected on his hearing son. Based on his son's data, Halliday theorized that the heart of the language learning process is not learning the structure of language but rather learning how to make meanings. More specifically, "Language is both a product of, and the means by which we have access to, the systems of meaning relationship that constitutes culture, the specifically human environment" (Halliday, 1975a). Consequently, language learning begins as soon as the child systematically uses actions and vocalizations to achieve certain goals or purposes. In this initial stage (phase I) a given vocalization or gesture is used exclusively for a single function so that function equals use. The transition to the adult linguistic system occurs in phase II as the child begins to develop more generalized functional categories through the acquisition of grammar and then adopts linguistic roles, e.g., questioner, narrator.

respondent-informer, etc. Finally, phase III involves mastery of the principles of adult language which allows the child to mean more than one thing at a time. "Function" has now become an abstract category. Since this paper is primarily concerned with the functional development of deaf children in phases I and II, only these two phases will be described in more detail.

In analyzing his son's earliest prelinguistic acts starting at age 9 months, Halliday proposed that the following four functions appeared first:

> Instrumental ("I want"). The child expresses his/her demands and desires, e.g., points and reaches toward cookie.
>
> Regulatory ("Do as I tell you"). The child explicitly tries to control the actions of others, e.g., pats a chair and wants mother to sit down.
>
> Interactional ("You and me"). The child uses speech or gestures for primarily social or affective communication, e.g., "Hi."
>
> Personal ("Here I come"). The child expresses his/her feelings, interests, and actions, e.g., "Cat!" while looking at a cat.

These functions can be expressed nonlinguistically by using gestures, pointing, or systematic vocalizations as well as through conventional words. Later in phase I, the following two functions appear:

> Heuristic ("Tell me why"). The child demands and learns names for objects, e.g., "da?" while pointing to an object.
>
> Imaginative ("Let's pretend"). The child creates a world of his/her own through sound play, make-believe, e.g., sings "la-la-la."

These latter two functions are more language dependent; yet they are still extra-linguistic since they can be expressed nonsymbolically through actions.

Phase II, which is the transitional stage to adult language, occurs when the child acquires grammar. The ability to combine words allows the child to form two broader, more generalized functional categories, the Pragmatic[1] and Mathetic

---

[1]Halliday uses the term "pragmatic" to refer only to one particular developmental function of language and not to refer to the general domain of linguistics that studies the factors influencing the form of language, including the functions that language serves.

functions. The Pragmatic function requires an action response from the listener and subsumes the earlier Instrumental, Regulatory, and Interactional functions. It is the acquisition of grammar which allows the child to produce a pragmatic utterance that combines these earlier functions. For example, the child can now combine the Interaction attention-getting function with the Instrumental function by saying "Mommy cracker" (glossed as 'mommy, I want a cracker.') The Mathetic function arises from a combination of the Personal and Heuristic functions; this function involves using language to describe or to learn about the environment. For example, early in phase II a child learns to use two-word combinations such as "car broke" to describe objects and events.

A second important achievement that occurs late in phase II is the development of the most complex and sophisticated function, the Information function, which imparts information that is unknown to the listener. This function involves descriptions of events that the listener has not experienced, such as telling a grandparent what happened at school. The Informative function develops late in phase II and is solely defined by language itself. Statements which have the Informative function are <u>not</u> symbolic reflections about a <u>shared</u> experience. Rather they allow the listener to vicariously experience the described events. All the other functions "represent the use of language in contexts which exist independently of the linguistic system. But the informative function has no existence independent of language itself" (Halliday, 1975a, p. 31). It should be stressed that the Informative function does <u>not</u> include requests for absent objects or persons. While the latter utterances are free from the limitations of the immediate perceptual context, the function expressed is still extralinguistic since the child can express his/her intention nonsymbolically. For example, to communicate a desire for cookies when cookies are not visible, the child can lead

the parent to the cookie jar in the kitchen. In contrast, the Informative function depends entirely on the use of verbal or manual symbols. Additionally, this function requires the child to adopt social roles defined solely by language. For example, in answering an information-seeking question, e.g., "What did you do at Grandma's house?", the child must adopt the role of respondent-informer.

Based on Halliday's description of the Informative function, it is possible to infer two cognitive abilities that should be clear cognitive prerequisites for the development of the Informative function:

1. Representation of events independent of the immediate perceptual context
2. Role differentiation and adoption

In order to describe a past event without the perceptual support of the immediate here-and-now and without the listener's past participation or knowledge of the event, the child must create a mental representation of the event. According to Piaget (1952, 1954, 1962) this ability develops in stage 6 of the sensorimotor period at about 18 to 24 months of age. Regardless of whether or not stage 6 is a prerequisite for syntactic development (Bates, 1976; Corrigan, 1978), mental representation should be a prerequisite for the Informative function, However, mental representation alone not sufficient for this function to develop. A second prerequisite for the development of the Informative function requires adoption of the linguistic role of narrator or exchanger of information in asking and telling.

Thus, Halliday not only provides a detailed model of the development of linguistic functions, he also provides a framework for placing language in its social-cognitive context. But unfortunately most research involving hearing-impaired as well as hearing children has not used Halliday's model. Almost all the published studies with hearing-impaired children have used functional

categories based on Dore's work (1975, 1976) using a speech act model (Meadow, Greenberg, Erting & Carmichael, 1981; Curtiss, Prutting & Lowell, 1979; Day, 1981; Kantor, 1982).

The present paper applies Halliday's model in analyzing the development of the functions of communication in young deaf infants of hearing parents. In the following sections semilongitudinal data for five deaf children will be analyzed using adaptations of Halliday's categories. Discussion of these data will focus on comparing deaf children's and hearing children's use of language and on identifying cognitive skills that may be related to individual differences in functions of language expressed by deaf children of hearing parents. Due to the complexity of analyzing parent and child as a single interactive system and time constraints in analyzing parental utterances, the present analyses will be limited to the language functions expressed by the children.

Method

Subjects

The subjects were five severe to profoundly prelingually deaf children enrolled in the HI-MAPS Program, a parent-infant program using total communication. Three children were from working class families, and two of the children were white. See Table 1 for child characteristic data.

Children were videotaped at the parent-infant center by their teacher five times during their program participation as part of the program evaluation process. Each child interacted with the mother (or father) in a nursery playroom containing a slide, trampoline, tunnel, rocking horse, and practice stairs in addition to small toys. The teacher placed the child's favorite toys on the table and told the parent to follow the child's interests if the child wanted to play

Table 1

Child Characteristics

Subject	S_1	S_2	S_3	S_4	S_5
Sex	Male	Female	Male	Male	Female
Age Diagnosed	11 mo.	13 mo.	13 mo.	14 mo.	23 mo.
Age Started in Intervention Program	12 mo.	14 mo.	15 mo.	17 mo.	24 mo.
Etiology	genetic syndrome	rubella	meningitis	unknown	unknown
Other Handicapping Conditions	severe gross motor delay	none	none	none	none
Hearing Loss (unaided)	95 dB	70 dB	110 dB	90 dB	80 dB
Hearing Loss (aided)	45 dB	38 dB	60 dB	35 dB	44 dB
Age at First Videotape	23 mo.	17 mo.	16 mo.	20 mo.	24 mo.
Age at Fourth Videotape	35 mo.	33 mo.	33 mo.	31 mo.	38 mo.
Age at Fifth Videotape	39 mo.	36 mo.	36 mo.	35 mo.	40 mo.

with other toys. In the initial and final videotapes, parents were asked to leave the child alone in the room for three minutes. In this report, the separation and reunion episodes were not coded, and only the first, fourth, and fifth videotapes were analyzed for each child. The fifth videotape was made when the child left the parent-infant program to enter a preschool program for three-year olds. Each child and parent attended the parent-infant program twice weekly for a 1-hour weekly individual session and for a 2-hour weekly group session with two or three other deaf children and their parents.

Coding Procedures

The first, fourth, and fifth videotapes were transcribed for all the child's communicative acts--gestures, points, signs, and communicative vocalizations. Communicative vocalizations were defined as either vocalizations accompanying a gesture, point, or sign or as vocalizations where the child made eye contact or looked at the parent's face. A distinction was made between gestures and action-gestures following Goldin-Meadow and Feldman (1975). Action-gestures were defined as actions that affected the listener through the motor act itself. They included: (1) showing an object; (2) requesting objects using an open hand read; (3) refusing by pushing away the object; and (4) giving an object where a response is expected beyond accepting the object, e.g., giving mother the jar of bubbles so mother will open the jar. In contrast, gestures affected the listener through their symbolic meaning and did not involve direct action on any objects. For example, nodding one's head was coded as a gesture for "yes." Miming actions or objects were also coded as gestures. Action-gestures were coded for only the first 12 minutes of each videotape. Communicative acts did not include action-gestures, facial expressions, or body movements unless paired with a gesture, point, sign, or communicative vocalization.

Initially the parent's utterances, gestures, action-gestures, and points were transcribed in sequence by a single coder for the first 12 minutes of each videotape. The remaining parental utterances were transcribed only if they directly preceded or followed a child communicative act. Reliability checks on the parent's communicative acts and utterances were performed on 20% of the videotapes. There was 89% agreement on morphemes, 94% agreement on signs, 89% agreement on attention-getting gestures, and 72% agreement on points.

After the parent's utterances were transcribed, the author and a hearing native signer together viewed each videotape and added transcriptions and glosses of all the children's communicative acts. A hard-of-hearing coder who was fluent in ASL was used as a third coder for four children.

Each child's communicative act and action gesture was coded for function using a modification of Halliday's phase I and II categories. Because of time constraints, parental utterances have not yet been analyzed for function. For Ss 1, 2, 3, and 4 their communicative acts in all three sessions were coded according to the phase I functions. Communicative acts in session 1 were also coded for the Informative function to test Halliday's hypothesis that that function develops after phase I functions. Sessions 4 and 5 were double coded for phase I and II functions since the children were in early phase II and were not producing many combinations of signs, gestures, and/or points. For S5, session 1 was double coded using phase I and II functions since this child had already started to produce sign-gesture combinations in session 1. By sessions 4 and 5 that child was beginning phase III, so only phase II functions were coded.

Appendix A lists the phase I categories and modifications made for use with hearing-impaired infants. If there was no definite gloss for a communicative act, that act was coded as unclassifiable. The categories of Instrumental, Regulatory, Personal and Interactional were differentiated into several subcategories based on

pilot data and Halliday's detailed figures (1975a) and later writings (1975b, 1978). In addition a separate category for Imitation/Practice was added because pilot work and teacher observations indicated that some deaf children showed a high frequency of imitation without comprehension or were frequently asked to imitate, e.g., "say (sign) X." Elicited imitations and spontaneous imitations unrelated to the child's activities did not appear to serve any other conversational function except imitation (Keenan, 1977). Consequently a separate category of Imitation/Practice was established to distinguish elicited and unrelated imitations from repetitions that were related to the child's activity or to the conversation.

Multisign utterances were coded as expressing the phase II functions of Pragmatic, Mathetic, Informative or combined Pragmatic-Mathetic function. Multisign combinations were defined as combinations of gestures, signs or points according to the procedures given by Hoffmeister, Moores, and Ellenberger (1975). An action-gesture combined with a gesture, sign, or point was not considered to be a multisign combination. Halliday's Informative function was differentiated into nonpretend and pretend play categories. Nonpretend informative utterances were defined as utterances conveying information unknown to the audience describing a real event not observed or known by the audience. Pretend play informative utterances served a combined Informative-Imaginative function by conveying new information involving either imaginary or dissimilar play objects, e.g., child holds a block and signs "ME EAT COOKIE."

Results and Discussion

The results of the present study were generally consistent with Halliday's model of functional development. In spite of the fact that the deaf children were at least 16 months old in session 1, the functions of their communicative acts and

action-gestures were largely limited to Halliday's earliest four functions--the Instrumental, Regulatory, Interactional, and Personal functions. The Heuristic, Imaginative, and Informative functions developed later as predicted by Halliday. Table 2 presents the mean percent of phase I functions expressed by the children's communicative acts in sessions, 1, 4, and 5. Since action-gestures were used infrequently for similar functions as communicative acts, the action-gesture data will not be reported in this paper.

Table 2

Mean Percentage of Phase I Functions Expressed in Children's Communicative Acts

	Session 1[a] Mean %	Session 4[b] Mean %	Session 5[b] Mean %
Instrumental	33.48% (39.82)	25.39%	21.49%
Regulatory	21.07% (20.72)	14.23%	34.11%
Interactional	10.72% (8.29)	24.37%	23.78%
Personal	22.51% (18.45)	22.67%	12.99%
Heuristic	.41% (0.00)	.37%	.56%
Imaginative	1.22% (0.00)	.37%	0.00%
Imitative/Practice	3.28% (4.11)	3.29%	2.12%
Informative[c]	.41 (0.00)	0.00%	.28%
Unclassifiable	6.90% (8.62)	9.31%	4.70%
Average rate of Communicative Acts/Minute	1.96 (1.76)	2.45	2.54

[a] The numbers in parentheses are the means for Ss 1, 2, 3, 4 excluding S5. The numbers not in parentheses are the means for all five subjects.

[b] The means for sessions 4 and 5 were based only on Ss 1, 2, 3, 4 since S5's utterances were too complex to be coded using Phase I functions. Data for sessions 4 and 5 were also recoded for Phase II functions.

[c] Informative function, a Phase II function, was included to test Halliday's hypothesis that this is the last function to appear.

While the results in general supported Halliday's model, there were differences between hearing and deaf children in regard to when the Heuristic and Imaginative functions develop, as well as individual differences among the deaf children. The following sections will present more detailed analysis of each individual child's functional development. Because the general similarity of S1, S2, S3, and S4's development, data from these four children will be discussed together.

Subjects 1, 2, 3, and 4

The four children S1, S2, S3, and S4 were only productively using two or three of the four earliest functions in session 1 (see Table 3) where productivity was defined as expression of a given function by three or more communicative acts in a single session. The Instrumental function was the only function productively used by all the children. This finding suggests that the Instrumental function was the first function acquired or was at least the most salient function for these deaf children.

By session 5 all four children were each productively using the Instrumental, Regulatory, Interactional and Personal functions and most subcategories of those functions. Furthermore, all four children showed syntactic development. By session 4, they all had entered phase II with the use of multisign utterances. All four children produced at least three multisign utterances expressing the Pragmatic function in sessions 4 or 5; S1, S2 and S3 also produced at least three multisign utterances expressing the Mathetic function.

While these children showed clear progress with respect to their use of the Instrumental, Regulatory, Interactional, and Personal functions and their corresponding subcategories, they showed very limited, if any, progress in the use of the Heuristic, Imaginative and Informative functions. Each child's data confirmed Halliday's prediction that the Heuristic and Imaginative functions develop after

TABLE 3

BEST COPY AVAILABLE

INDIVIDUAL CHILDREN'S USE OF FUNCTIONS IN SESSION I

	S 1		S 2		S 3		S 4		S 5	
	No.	%	No.	%	No.	%	No.	%	No.	%
Instrumental	4	14.29%	5	29.41%	22	46.81%	11	68.75%	4	8.16%
1. Agree/Volitional	2	7.14	5	29.41	18	38.30	11	68.75	4	8.16
Object										
2. Protest	2	7.14	0	0	4	8.51	0	0	0	0
Multisign utt.-Pragmatic	0	0	0	0	0	0	0	0	0	0
Regulatory	8	28.57	6	35.29	6	12.77	1	6.25	11	22.45
1. Request/Agree	8	28.57	5	29.41	3	6.38	1	6.25	10	20.41
2. Protest	0	0	1	5.88	3	6.38	0	0	1	2.04
3. Self-regulatory	0	0	0	0	0	0	0	0	0	0
Multisign utt.-Pragmatic	0	0	0	0	0	0	0	0	4	8.16
Interactional	2	7.14	3	17.65	1	2.13	1	6.25	10	20.41
1. Attention	1	3.57	1	5.88	0	0	1	6.25	5	10.20
2. Social Rituals	1	3.57	2	11.76	1	2.13	0	0	4	8.16
3. Labelling Games	0	0	0	0	0	0	0	0	1	2.04
Multisign-Pragmatic	0	0	0	0	0	0	0	0	1	2.04
Multisign-Mathetic	0	0	0	0	0	0	0	0	1	2.04
Personal	9	32.14	1	5.88	8	17.02	3	18.75	19	38.78
1. Pleasure	1	3.57	1	5.88	5	10.64	3	18.75	2	4.08
2. Self-descriptive	1	3.57	0	0	3	6.38	0	0	5	10.20
3. Objects/others	7	25.00	0	0	0	0	0	0	12	24.49
Multisign-Mathetic	0	0	0	0	0	0	0	0	3	6.12
Heuristic	0	0	0	0	0	0	0	0	1	2.04
Multisign-Mathetic	-	-	-	-	-	-	-	-	0	0
Imaginative	0	0	0	0	0	0	0	0	3	6.12
Multisign-Mathetic	-	-	-	-	-	-	-	-	0	0
Imitative/Practice	4	14.29	0	0	1	2.13	0	0	0	0
Informative	0	0	0	0	0	0	0	0	1	2.04
Unclassifiable	1	3.57	2	11.76	9	19.15	0	0	0	0
Total No. Communicative Acts	28		17		47		16		49	
Length of Session Analyzed	16 min.		14.35 min.		15.53 min.		15.13 min.		18.97 min.	
Rate Comm. Acts/Min.	1.75		1.18		3.03		1.06		2.79	

the Instrumental, Regulatory, Interactional and Personal functions. However, these data did not support Halliday's claim that the Heuristic and Imaginative functions appear late in phase I. Even by session 5, the Imaginative and Heuristic functions were not productive for any of the four children (see Tables 3, 4 and 5), in spite of the fact that all the children had progressed to phase II and were combining gestures and signs to form multisign utterances.

These data suggest that unlike hearing children, deaf children of hearing parents do not develop the Imaginative and Heuristic functions before they start forming sign and gestural combinations and acquire grammar. The late appearance of the Heuristic function is consistent with other studies that have found that deaf children of hearing parents infrequently ask information-seeking questions (Day, 1981; Meadow, et al., 1981).

Consistent with their delays in producing the Heuristic an Imaginative functions, Ss 1, 2, 3, and 4 also were delayed in producing any examples of the Informative function (Halliday's most complex and sophisticated function which appears late in phase II). The delays of Ss 2, 3, and 4 are best explained by the fact that these children were just beginning phase II. Subject 4 was not yet productively producing mathetic utterances by session 5, and 2-sign combinations at most constituted only 14% of Ss 2 and 3's utterances.

An explanation of S1's delays in producing the Informative function is more complicated. This child's delay cannot be attributed to delays in syntactic development since he produced 5- and 6-sign utterances. Instead, his delay may be best explained by his lack of role-taking skills, one of the two previously postulated cognitive prerequisites for the Informative function. According to Halliday this skill is first manifested by the child's ability to engage in dialogue. Both dialogue and the Informative function require the child to adopt purely linguistic roles that are more specific than the roles of addresser ("I'm

TABLE 4 Development of Language Functions

INDIVIDUAL CHILDREN'S USE OF FUNCTIONS IN SESSION 4

	S_1		S_2		S_3		S_4		S_5[a]	
	No.	%	No.	%	No.	%	No.	%	No.	%
Instrumental	29	42.65	6	10.91%	14	19.44%	6	28.57%		
1. Agree/Volit. Obj.	27	39.71	6	10.91	12	16.67	6	28.57		
2. Protest	2	2.94	0	0	2	2.78	0	0		
Multisign utt.-Pragmatic	4	5.88	1	1.82	3	4.17	3	14.29		
Regulatory	9	13.24	1	1.82	12	16.67	5	23.81		
1. Request/Agree	7	10.29	1	1.82	9	12.50	3	14.29		
2. Protest	2	2.94	0	0	3	4.17	2	9.52		
3. Self-regulatory	0	0	0	0	0	0	0	0		
Multisign utt.-Pragmatic	2	2.94	0	0	2	2.78	1	4.76		
Total Pragmatic	6	8.82	1	1.82	5	6.94	4	19.05	52	36.88
Interactional	11	16.18	17	30.91	26	36.11	3	14.29		
1. Attention	0	0	2	3.64	7	9.72	3	14.29		
2. Social Rituals	2	2.94	4	7.27	1	1.39	0	0		
3. Labelling Games	9	13.24	11	20.00	18	25.00	0	0		
Multisign-Mathematic	0	0	2	3.64	4	5.56	0	0		
Multisign-Pragmatic	0	0	0	0	0	0	0	0		
Personal	12	17.65	13	23.64	15	20.83	6	28.57		
1. Pleasure	5	7.35	0	0	5	6.94	0	0		
2. Self-Descriptive	3	4.41	2	3.64	1	1.39	3	14.29		
3. Objects/Others	4	5.88	11	20.00	9	12.50	3	14.29		
Multisign-Mathetic	3	4.41	3	5.45	1	1.39	2	9.52		
Heuristic	1	1.47	0	0	0	0	0	0		
Multisign-Mathetic	0	0	-	-	-	-	-	-		
Imaginative	1	1.47	0	0	0	0	0	0		
Multisign-Mathetic	0	0	-	-	-	-	-	-		
Total Mathetic	3	4.41	5	9.09	5	6.94	2	9.52	36	25.53
Mathetic with Pragmatic	0	0	0	0	1	1.39	0	0	5	3.55
Imitative/Practice	4	5.88	4	7.27	0	0	0	0	2	1.42
Informative	0	0	0	0	0	0	0	0	37	26.24
1. Nonpretend	-	-	-	-	-	-	-	-	3	2.13
2. Pretend	-	-	-	-	-	-	-	-	34	24.11
Unclassifiable	1	1.47	14	25.45	4	5.56	1	4.76	9	6.38
Total No. Communicative Acts	68		55		72		21		141	
Length of Session Analyzed	22.23 min.		20.06 min.		23.67 min.		22.08 min.		29.1 min.	
Rate Comm. Acts/Min.	3.06		2.74		3.04		.95		4.85	

[a] Only Phase II functions were coded for this child.

TABLE 5 Development of Language Functions

INDIVIDUAL CHILDREN'S USE OF FUNCTIONS IN SESSION 5

	S_1		S_2		S_3		S_4		S_5[a]	
	No.	%	No.	%	No.	%	No.	%	No.	%
Instrumental	16	17.78%	9	25.00%	18	26.09%	14	17.07%		
1. Agree/Volit. Obj.	15	16.67	9	25.00	16	23.19	9	10.98		
2. Protest	1	1.11	0	0	2	2.90	5	6.10		
Multisign utt.-Pragmatic	6	6.67	4	11.11	2	2.90	1	1.22		
Regulatory	22	24.44	7	19.44	24	34.78	43	52.44		
1. Request	15	16.67	4	11.11	22	31.88	35	42.68		
2. Protest	5	5.56	3	8.33	1	1.45	8	9.76		
3. Self-regulatory	2	2.22	0	0	1	1.45	0	0		
Multisign utt.-Pragmatic	8	8.89	0	0	2	2.90	4	4.88		
Total Pragmatic	14	15.56	4	11.11	4	5.80	5	6.10	24	24.24%
Interactional	22	24.44	11	33.56	10	14.49	21	25.61		
1. Attention	0	0	0	0	7	10.14	7	8.54		
2. Social Rituals	9	10	10	27.78	2	2.90	3	3.66		
3. Labelling Games	13	14.44	1	2.78	1	1.45	11	13.41		
Multisign-Mathematic	8	8.89	0	0	0	0	0	0		
Multisign-Pragmatic	0	0	0	0	0	0	0	1.22		
Personal	25	26.67	1	2.78	13	18.84	3	3.66		
1. Pleasure	2	2.22	0	0	2	2.90	0	0		
2. Self-Descriptive	2	2.22	1	2.78	10	14.99	0	0		
3. Objects/Others	21	22.22	0	0	1	1.45	3	3.66		
Multisign-Mathetic	13	14.44	0	0	1	1.45	0	0		
Heuristic	2	2.22	0	0	0	0	0	0		
Multisign-Mathetic	2	2.22	-	-	-	-	-	-		
Imaginative	0	0	0	0	0	0	0	0		
Total Mathetic	23	33.33	0	0	1	1.45	0	0	51	51.51[b]
Mathetic with Pragmatic	1	1.11	1	2.78	1	1.45	0	0	1	1.01
Imitative/Practice	0	0	2	5.56	2	2.90	0	0	5	5.05
Informative	0	0	0	0	0	0	0	0	13	13.13
1. Nonpretend	-	-	-	-	-	-	-	-	1	1.01
2. Pretend	-	-	-	-	-	-	-	-	12	12.12
Unclassifiable	2	2.22	5	13.89	1	1.45	1	1.22	4	4.04
Total No. Communicative Acts	90		36		69		82		99	
Length of Session Analyzed	28.52 min.		20.12 min.		22.93 min.		36.37 min.		24.07 min.	
Rate Comm. Acts/Min.	3.16		1.74		3.01		2.25		4.03	

[a] Only Phase II functions were coded for this child.

[b] This includes 21 labeling responses during a naming game where parent pointed to 17 pictures and asked "what's that?" as test questions.

talking to you") and listener ("Attend!"). The earliest more specific roles involve requesting and giving responses of a purely linguistic nature, as opposed to responses that are instrumental or regulatory in function. By session 5, S1 could respond to wh-test questions, but not to information-seeking yes/no questions. He was only just beginning to initiate dialogue using heuristic questions ("HURT?" glossed as 'Are you hurt?'). Since his linguistic-role taking skills were not more fully developed, it would not be expected that he would produce the Informative function.

Subject 5

This child differed markedly from the other four children in her functional use of language in all three sessions. Her functional development followed most closely Halliday's model. In session 1 one month after program entry at 24 months, she productively used the Instrumental, Regulatory, Interactional, Personal, and Imaginative functions and their functional subcategories. In session 1 she was already in early phase II, for she produced five multisign utterances expressing the Pragmatic function and four multisign utterances expressing the Mathetic function (see Table 3). The only phase I function that she did not productively use in session 1 was the Heuristic function.

In comparing S5 with the other four deaf children at session 1, it should be noted that S5 was the oldest of the five children. She was diagnosed at 23 months and was videotaped at 24 months. The differences between this child and the other four children, however, cannot be solely attributed to her more advanced age. All the children were at least 35 months old by session 5, yet none of the other four children showed any examples of the Imaginative function in any of the sessions. Thus, her functional communication skills at 24 months were more advanced than the other four children's skills at 35 months of age.

Furthermore, the difference between S5 and the other four children is not primarily a function of either her high level of general cognitive functioning or sign skills of her parents. All the children were given the Leiter International Performance Scale one week before session 5, and both S5 and S1 scored equally well. The sign skills of S5's parents also do not fully account for the fact that her functional language skills were more advanced in session 1 at age 24 months than the other four children's skills in session 5 at 36 months. Although S5's parents learned to sign very rapidly and were using some 2-sign combinations in the first session, all the mothers of the other four children were at the very minimum signing some 2- and 3-sign sentences by session 5. Furthermore, the mothers of Ss 1 and 3 were very consistent in using Total Communication in sessions 4 and 5. Thus, the general level of parental sign skills does not account for the fact that none of these four children's functional language skills was not as advanced in session 5 as S1's skills in session 1. Since the parental data has not been fully analyzed, no more specific relationship between parental sign skills and functional development could be examined.

The complexity of S5's communicative functions and her symbolic play skills in session 1 are illustrated in the following two episodes of doll play. In the first episode there are two chained communicative acts expressing an Imaginative function.

Mother: "Is she wet?[2]
STINKY pt (doll)
" Is she wet?"
Child: (Looks at mother)
Mother: "Huh?"

---

[2] Signs are written in all capitals; spoken words in lower letters. If an utterance contains both spoken words and signs or gestures, the signs or gestures are written above the words with which they are paired. If the sign is the same as the spoken word, an "S" is written above the word.

Child: (Touches doll's panties)
"STINKY"
(feels doll's pants)
Gesture: Shakes head with scolding vocalization directed at doll
(glossed as pretending to scold the doll)
(Smiles and looks at mother)
Mother: (laughs)
Child: (walks away from doll)

The sign "STINKY" and the gesture shake head with a scolding vocalization were both used for the Imaginative function in pretending that the doll had wet her pants. S5 also expressed one possible example of the Informative function--the most advanced and important function of language--in the following pretend play context.

Father: (releases doll on slide)
(doll slides down and lands on floor)
Child: (picks up doll with concerned look on her face)
(pats doll)
Father: (laughs)
"The baby's O.K." (laughs)
Mother: (laughs)
Child: Action-Gesture: gives mother doll
nods ⟶
Mother: (takes and holds doll) "She's o.k."
"Yeah" (pats doll's back)
Child: "HURT++"
nods ⟶
S S
Mother: "She's hurt. Hurt."

Unlike the stinky episode where the mother already introduced the concept that the doll may be stinky, in this episode the mother has not signed that the doll is hurt. Thus the sign "HURT" may have served a combined Informative-Imaginative function by giving the new make-believe information that the doll is hurt.

By session 4, S5 was productively using the Informative function as well as the Heuristic function. She had learned the sign "YESTERDAY" several months earlier and could answer the teacher's questions about what she had done yesterday. In the last two sessions she produced a total of 50 Informative utterances; however, as in session 1 most of the utterances were produced in a pretend play

context and served a combined Informative-Imaginative function (see Tables 4 and 5). Of the 50 Informative utterances, only four provided the audience with new unknown information about a real event. This finding was unexpected, and the preference for expressing make-believe information may have reflected in part play context.

The Informative utterances in a pretend play context were used by S5 to describe and identify imaginary objects, states and events as part of complex pretend play sequences. For example, S5 pretended that she was Santa Claus in the following episode:

Child: "ME SANTA-CLAUS"
"ME WILL GO TO"
S S S S
Father: "You are Santa Claus?" } simultaneous utterances
Child: Gesture: nods
Father: "OK" (sign only)
Child: "FRIDAY WILL COME BACK WILL GIVE THAT CHRISTMAS TOYS OK"
Father: "You will come back and give me some Christmas toys?" "OK" } Father interprets as child signs
Child: (goes over and gets cash register and then walks over to father on her tip toes pretending to be Santa Claus carrying toys. Pretends to knock on an imaginary door)

The child's three utterances served both Informative and Imaginative functions since they describe events unknown to the father as part of imaginary pretend play. The Santa Claus play continued for three more minutes; as part of this play the father spilled imaginary coffee, and "Santa Claus" drank the coffee and then pretended to swim and showed the father her imaginary wet beard. During these pretend events the child produced six more Informative-Imaginative utterances, three pretend pragmatic and three pretend mathetic utterances.

The unexpected high frequency of Informative utterances in imaginary pretend play episodes suggests that this kind of play may serve an important role in facilitating the development of linguistic functions. Such a relationship is

congruent with the data from S1 who was the only other child that was syntactically advanced enough to use the Informative function. Subject 1 did not use the Informative function nor did he display any examples of imaginary pretend play in either the videotaped sessions or in his educational sessions with the teacher.[3] Unlike S5's father who frequently initiated imaginary pretend-play in the educational sessions, S1's mother did not initiate any imaginary pretend play. However, S1 and his mother frequently engaged in pretend doll play with realistic objects.

Relationship Between Pretend Play and Language

Much of the current research concerning the relationship between language and symbolic play has focused on establishing a specific relationship between the child's level of symbolic play and level of language development in terms of vocabulary acquisition (Bloom, 1973; Corrigan, 1978; Volterra, et al., 1979) or word combinations (Corrigan, 1981; McCune-Nicolich, 1979, 1981). The present data concerning deaf children's functional language skills suggest a different type of relationship, one between imaginary pretend play and the Informative function of language. While Halliday describes the development of the Informative function as part of dialogue, he does not address the question of why the Informative function develops. What motivates the child to learn to tell new information not experienced by the audience? The present study's unexpected finding that the Informative function occurred predominantly in imaginary pretend play situations suggests that pretend play may be one important motivating factor.

Complex pretend play with imaginary or dissimilar objects may be ideal for eliciting the Informative function as well as the Imaginative function for two

---

[3] The teacher sometimes engaged in imaginary pretend play in the educational sessions, but did not specifically model or encourage such play. Most of the pretend play that was modeled was doll play with realistic objects.

reasons. First, the child must give linguistic information via the combined Informative-Imaginative function in order for another person (usually the parent) to successfully participate in such play with the child. The participants cannot depend on extralinguistic information from the immediate perceptual context in order to fully understand the content of the play since imaginary or dissimilar objects are being used. Instead, the child must initiate dialogue and tell the participants the the identities of the pretend objects or actions. For example, when S5 pretended to be Santa Claus, the multisign utterance "ME SANTA CLAUS" was necessary in order for her father to join in the play. Consequently, pretend play can motivate children to learn the Informative function because of the pleasure derived from others understanding and participating in their play.

A second related reason why pretend play may motivate the child to develop the Informative function concerns the salient here-and-now aspect of the play. In nonpretend play situations, children may not be motivated to "tell Daddy what you did today" unless a highly salient event occurred and they want to stop their immediate activities to describe the event. In contrast, when a child is engaged in make-believe pretend play, there is immediate communicative pressure to tell others about the play so they can join in.

In addition to pretend play being a highly motivating and supportive context for the development of the Informative function, symbolic play and the Informative function may involve shared cognitive role-taking skills. Informative utterances require the child to assign and assume linguistic roles. In pretend-play the child must also learn to assign and adopt play roles through role substitution (Field, et al., 1982; Watson & Fischer, 1977). A sophisticated differentiation of play roles is required in order for children to place a doll in an "active" role, e.g., the doll walks instead of being dragged, and later to verbally differentiate themselves from their pretend roles by announcing and then pretending that they

are someone else, e.g., "ME SANTA CLAUS." Both linguistic and play roles require the child to learn that he/she can assume many roles require the child to learn that he/she can assume many roles and can assign roles to others. Thus, these two types of role-taking skills may emerge in synchrony such that the development of one skill may facilitate the development of the other.

Another shared feature of pretend play and the Informative function is an inherent potential for creating a make-believe world independent of the "real" world. Through play with imaginary or dissimilar objects and through language used for the combined Informative-Imaginative functions, the child learns that one is not bound by mental representations of present, past or even probable events. Pretend play and language allow children to transcend their mental representations of the real world by creating a world of multiple meanings of their own (e.g., Derrida, 1979). This aspect of creativity gives both play and language tremendous power as rule-governed systems that are not limited to mental representations of real or even probable events.

These post-hoc hypotheses concerning the relationship between play and the Informative function should not be interpreted as meaning that pretend-play with imaginary or dissimilar objects is either necessary or sufficient for the development of the Informative function. Rather these hypotheses are a preliminary attempt to integrate theories of language development and symbolic play in order to consider how language may function within one particular social and cognitive context. Further research is sorely needed to verify the present set of somewhat speculative hypotheses. Such research must independently evaluate deaf and hearing children's symbolic play skills and their functional language skills. Only further research and theorizing regarding the relation of language functions to the child's cognitive and social activities will allow us to understand what motivates a child to learn new language functions.

Implications for Language Programming

Effective language programming for deaf infants requires accurate, detailed assessment of these infants' existing communication skills. The assessment should include not only the infants' grammatical skills but also their language function skills. The present study demonstrates the usefulness of Halliday's model of functional development in assessing young deaf children's functional skills. Halliday's categories may also be valuable in assessing parental style of communication and its influence on the child's functional development.

The present data suggest that encouragement of symbolic pretend play may be valuable for facilitating the development of the Imaginative and Informative functions as well as being valuable for its own sake. Pretend play can be encouraged by teachers initiating, expanding and modeling play skills at a more advanced level than the child's current skills. Involvement of parents in pretend play is especially important not only for the child but also for the parent. Since language is an integral part of pretend play, such play can help hearing parents use sign language in a non-didactic fashion. In pretend play, parents may be less likely to focus on trying to teach their child language since their attention is on the play. This event is especially likely if the child can form sequences of pretend acts so that parent and child can engage in more extended pretend play.

The above are a few examples of how Halliday's theory and the present results can be applied to parent-infant intervention programs. Research is needed to evaluate the effectiveness of intervention methods with respect to both the infant and the parent. Such research in conjunction with detailed studies of infants' and parents' use of language will enable us to develop more effective intervention programs.

Acknowledgements

This research was supported by a grant from the U.S. Department of Education, Special Education Programs, Grant G007900505, and a grant from the Foundation for Hearing and Speech Habilitation (Chicago, IL).

I am grateful to the staff members and the parents of the children enrolled in the HI-MAPS Program at the David T. Siegel Institute of Michael Reese Hospital for their cooperation and active participation in this research. Special thanks to Kay Haynes, R. Candy Haight, Hershella Hearns, Barbara Scully, Rhonda Cohen, and Sheri Phillips for transcribing and coding the data.

References

Bates, E. (1976). Language and context. New York: Academic Press.

Bloom, L. (1973). One word at a time. The Hague: Mouton.

Corrigan, R. (1978). Language development as related to stage 6 object permanence. Journal of Child Language, 5, 173-189.

Corrigan, R. (1981, April). The control of actor recipient relations in pretend play and language. Paper presented at SRCD, Boston.

Curtiss, S., Prutting, C., & Lowell, E. (1979). Pragmatic and semantic development in young children with impaired hearing. Journal of Speech and Hearing Research, 22, 534-552.

Day, P. (1981). The expression of communicative intention. In H. Hoeman & R. Wilbur (Eds.), Interpersonal communication and deaf people (Working Paper #5). Washington, DC: Gallaudet College.

Derrida, J. (1970). Structure, sign and play in the discourse of the human sciences. In R. Macksey & E. Donato (Eds.), The structuralist controversy. Baltimore: Johns Hopkins University Press.

Dore, J. A. (1974). A pragmatic description of early language development. Journal of Psycholinguistic Research, 3, 343-350.

Dore, J. (1975). Holophrases, speech acts and language universals. Journal of Child Language, 2, 21-39.

Field, T., DeStefano, L., & Koewler, J. (1982). Fantasy play of toddlers and preschoolers. Developmental Psychology, 38, 503-508.

Goldin-Meadow, S., & Feldman, H. (1975). The creation of a communication system. Sign Language Studies, 8, 225-234.

Halliday, M. A. K. (1975a). Learning how to mean. London: Edward Arnold.

Halliday, M. A. K. (1975b). Learning how to mean. In E. H. Lennenberg & E. Lennenberg (Eds.), Foundations of language development. New York: Academic Press.

Halliday, M. A. K. (1978). Meaning and the construction of reality in early childhood. In H. Pick & E. Saltzman (Eds.), Modes of perceiving and processing information. Hillsdale, NJ: Lawrence, Erlbaum and Associates.

Hoffmeister, R., Moores, D., & Ellenberger, R. (1975). Some procedural guidelines for analyzing ASL. Sign Language Studies, 7, 121-137.

Kantor, R. (1982). Communicative interaction. Sign Language Studies, 32, 233-282.

Keenan, E. (1977). Making it last: Uses of repetition in children's discourse. In S. Ervin-Tripp & C. Mitchell-Kernan (Eds.), Child discourse. New York: Academic Press.

Meadow, K., Greenbery, M., Erting, C., & Carmichael, H. (1981). Interactions of deaf mothers and deaf preschool children. American Annals of the Deaf, 126, 454-568.

McCune-Nicolich, L. (1979, December). The transition from sensorimotor to symbolic processes in play and language. Paper presented at New York Language Conference.

McCune-Nicolich, L. (1981). Toward symbolic functioning: Structure of early pretend games and potential parallels with language. Child Development, 52, 785-797.

Nelson, K. (1979). The role of language in infant development. In M. Bornstein & W. Kessen (Eds.), Psychological development from infancy. Hillsboro, NJ: LEA.

Piaget, J. (1952). The origins of intelligence in children. New York: Norton.

Piaget, J. (1954). The construction of reality in the child. New York: Basic Books.

Piaget, J. (1962). Play dreams and imitation in childhood. New York: Norton.

Trevarthen, C. (1980). The foundations of intersubjectivity. In D. R. Olson (Ed.), The social foundations of language and thought. New York: Norton.

Volterra, V., Bates, E., Benigni, L., Bretherton, I., & Camajoni, L. (1979). First words in language and action. In E. Bates (Ed.), The emergence of symbols. New York: Academic Press.

Watson, M., & Fischer, K. (1977). A developmental sequence of agent use in late infancy. Child Development, 48, 828-836.

APPENDIX A

Phase I Developmental Functions

A. INSTRUMENTAL: Communicative acts used to express the child's desires or wishes regarding objects

Volitional Object/Agree

Child's act can be glossed as "I want..." (e.g., reaches for bottle and signs "MILK"); 2) act indicates agreement with an instrumental question asked by the parents "You want...?" (e.g., child nods head yes or points at the object). Compliance without gesturing, pointing, signing or vocalizing while looking at the parent is not coded as a communicative act.

Protest

Child's act can be glossed as "I don't want" (e.g., shakes head no); 2) act indicates disagreement with instrumental question "You want...?" (e.g., gestures, signs or vocalizes lack of desire).

B. REGULATORY: Communicative acts that specify the action that the child wants the parents to perform on the desired object.

Request/Agree/Request Permission

Child specifies desired action to be performed (e.g., child gestures PUSH so that mother will push the car); 2) act indicates agreement with immediately preceding regulatory request made by parent (e.g., parent tells child to push the car and child nods head yes; compliance alone is not coded as a communicative act); 3) act can be glossed as "Can I do ..." or "Is this OK?"

Protest

Child responds to parents' action or utterance by indicating that parent should stop that action (e.g., parent is pushing a car and child gestures STOP); 2) act indicates disagreement with parent's immediately preceding regulatory request (e.g., parent tells child to stop eating, and child gestures, signs or vocalizes desire to continue eating).

Self-regulatory

Child's communicative act is used to direct his/her own actions (e.g., holds puzzle piece and signs "LOOK" to self).

C. INTERACTIONAL: Child's use of communicative acts to interact with another person by either initiating the interaction or maintaining contact.

Attention

Acts used to obtain another person's attention, e.g., tap on the arm, signing "LOOK;" 2) pointing to an object without signing or gesturing.

Social Rituals/Interactions

Greetings and polite phrases (e.g., "HI," "BYE," "THANK-YOU;" 2) acts that occur in ritualized games such as "peek-a-boo;" 3) acts used to maintain conversations (e.g., nods head).

C. INTERACTIONAL (con't)

Test Questions/Labeling Games

Child responds to utterances such as "Where's X?" by pointing at the object, or "What's that?" by labeling where answer is already known by adult; (2) child spontaneously imitates the name of the object being played with; 3) child's act is used as part of a game where child points to several objects/pictures and adult labels each.

D. PERSONAL: Child's communicative acts that reflect or describe the child's own feelings and actions, or child's attention to objects/events.

Pleasure

Acts expressing pleasure in mastery, or pleasure in general (e.g., child smiles and vocalizes to parent, child signs "YEA").

Self-Descriptive

Acts used to describe own feelings, actions or state (e.g., child is angry and signs "MAD;" 2) acts used to establish child's possession or control over objects (e.g., child reaches for a toy and signs "MINE").

Interest Others/Objects

Acts used to describe another person's feelings, actions, state (e.g., child signs "CRY" when looking at a picture of a boy crying);
2) nonimitated acts indicating objects that child is attending to or looking at. Act must include a sign or gesture as a comment on the object (e.g., child points to dog and signs "DOG").

E. HEURISTIC: Questions about objects/events which allow for learning about environment. Most elementary form is demand for a name where sign is not already in child's receptive vocabulary. This function may originate from the labeling game subcategory of the interaction function. Includes "where" questions and answers to wh-questions where the object is not visible.

F. IMAGINATIVE: Child's use of vocalizations or gestures to create own world through games, songs, stories, pretend play, or symbolic play (e.g., child signs "ME SANTA CLAUS"). Also includes child's play with the form and meanings of sings by purposefully distorting signs or inventing signs.

G. IMITATION: Imitated acts are coded as one of the above pragmatic functions whenever possible. Acts are coded as Imitation only when the act is directly elicited or when the child's subsequent actions are <u>not</u> related to the imitated sign, gesture or vocalization.